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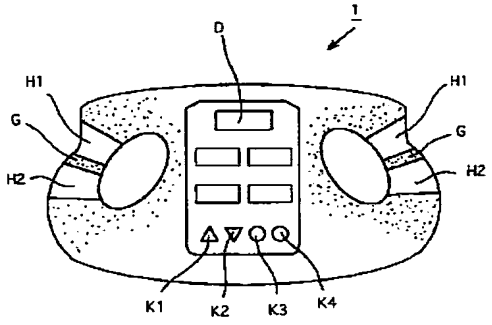
Ｆターム(参考)　4C017 AA20 AB02 AC16 BD01
4C027 AA06 BB05 DD07

(54)【発明の名称】　エアロビック運動器具

(57)【要約】
【課題】心拍計のグリップ電極を利用して体脂肪を測定することにより、筋肉量の変化を把握して適正な運動量の目標設定ができるようにする。
【解決手段】エアロビック運動器具に取り付けるコントロールボックス１は、人体インピーダンス測定回路２を内蔵し、筐体の左右にグリップＧを取り付けて４端子電極を構成する給電側電極Ｈ１、Ｈ１と検出側電極Ｈ２、Ｈ２を装着し、正面にカラーＬＣＤの表示部Ｄを設け、その下方にアップキーＫ１、ダウンキーＫ２、選択キーＫ３、開始・終了キーＫ４をそれぞれ配置する。



しても安直に体脂肪を測定する機能を追加することができる。

【図面の簡単な説明】

【図１】本発明を実施した自転車エルゴメータの構成図である。

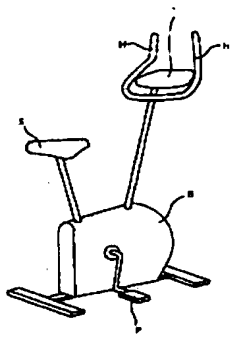
【図２】本発明を実施したコントロールボックスの正面図である。

【図３】本発明を実施した人体インピーダンス測定回路のブロック図である。

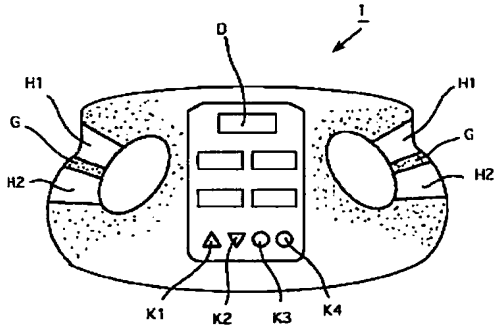
【符号の説明】

1	コントロールボックス
2	人体インピーダンス測定回路
２１	発振器
２２	駆動回路
２３	切換スイッチ
２４	帯域フィルタ
＊２５	整流回路
２６	増幅器
２７	Ａ／Ｄ変換器
２８	切換ユニット２８
２９	切換制御回路
4	ＣＰＵ
6	Ｉ／Ｏインタフェース
B	ボディ部
H	ハンドル
H１	給電側電極
H２	検出側電極
K	キー
P	ペダル
S	サドル
Ｔ１～Ｔ２	トランス

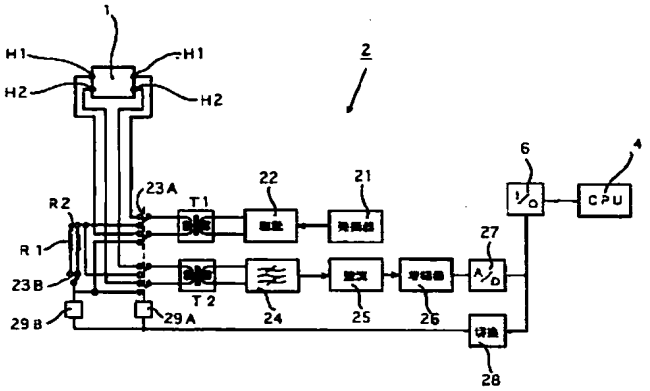
【図１】



【図２】



【図３】



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CLAIMS

[Claim(s)]
[Claim 1]A human-body-impedance measuring means which grasps said grip electrode to a control box, and measures human body impedance to it, comprising, A personal-data input means which inputs personal data of sex, age, height, and weight, Aerobic sports equipment displaying a body fat percentage which was provided with said human body impedance and a body fat percentage calculating means which computes a body fat percentage based on personal data, and said body fat percentage calculating means computed on said indicator.
An indicator.
A grip electrode which grasps by hand and measures a heart rate.

[Claim 2]A human-body-impedance measuring means which grasps said grip electrode to a control box, and measures human body impedance to it, comprising, A personal-data input means which inputs personal data of sex, age, and height, and a body fat percentage calculating means which computes a body fat percentage based on said human body impedance, a measurement-of-body-weight value, and personal data, A preparation, aerobic sports equipment displaying a body fat percentage which said body fat percentage calculating means computed on said indicator.
An indicator.
A measurement-of-body-weight means to input an output signal of a weight sensor as a grip electrode which grasps by hand and measures a heart rate, and to measure weight.

[Claim 3]The aerobic sports equipment according to claim 1 or 2 attaching said control box exchangeable.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]The treadmill with which this invention performs walking movement and jogging movement, The bicycle ergometer which performs cycling movement, the steer climber who performs stairs going-up movement, The rowing machine which performs boat stroke movement, the Nordic-events machine which performs cross-country-skiing movement, etc. are related with the aerobic sports equipment which is effective in supplying oxygen and burning body fat by exercise of the whole body.
[0002]
[Problem(s) to be Solved by the Invention]The purpose of exercising using aerobic sports equipment is an aim also with big strengthening a cardiopulmonary function, consuming body fat excessive besides heightening whole body endurance etc., canceling and also using obesity as the tightened body. For example, cycling movement using a bicycle ergometer is aerobic movement which has most generally gone in the fitness institution. There being few body motions and the upper body's being stable as the feature, the membrum inferius, a thing [the burden to the lumbar part], etc. are raised. The latest aerobic sports equipment has many which can monitor a heart rate quite correctly by year sensor, a grip electrode, etc., and the kind of exercise program built in the microcomputer is also abundant, There is also an exercise program which can adjust a fixed heart rate automatically from what is controlled by a manual, for example so that it may become less than **five heartbeats.
[0003]By physiological adaptation, muscles get fat by giving load, and activate a nervous system, and its muscle function improves. It is necessary to give the resistance beyond the muscular power which the minimum also uses in everyday life from the principle of an overload (overload) to muscles as load strength of resistance training. Since it shrinks if it does not use, and a function also falls in connection with it, in order to maintain the effect acquired by

training, it is important for muscles to perform continuous training also after that. It is [however] large, and by the time the effect brought about by the morphological change of muscles, such as myopachynsis, by adaptation of a nervous system shows up, the pile of prolonged training is required for the effect acquired by short resistance training. Thus, more effective training can be performed, if weight and body fat are measured, change of muscular volume is grasped and the target of proper quantity of motion is set up, when performing aerobic movement for the purpose of the diet of strengthening of strength of its legs, ******, etc.

[0004]Then, this invention is made for the purpose of grasping change of muscular volume and being able to be made to perform goal setting of proper quantity of motion by measuring body fat using the grip electrode of the heart rate meter with which the latest aerobic sports equipment is equipped.

[0005]

[Means for Solving the Problem]In order to attain this purpose, this invention was constituted as follows.

[0006]Namely, a grip electrode which grasps an invention of claim 1 by a hand with an indicator, and measures a heart rate, A human-body-impedance measuring means which grasps said grip electrode to a control box which ****, and measures human body impedance to it, A personal-data input means which inputs personal data of sex, age, height, and weight, It is aerobic sports equipment displaying a body fat percentage which was provided with said human body impedance and a body fat percentage calculating means which computes a body fat percentage based on personal data, and said body fat percentage calculating means computed on said indicator. A grip electrode which grasps an invention of claim 2 by a hand with an indicator, and measures a heart rate, A human-body-impedance measuring means which grasps said grip electrode to a control box which has a measurement-of-body-weight means to input an output signal of a weight sensor and to measure weight, and measures human body impedance to it, A personal-data input means which inputs personal data of sex, age, and height, and a body fat percentage calculating means which computes a body fat percentage based on said human body impedance, a measurement-of-body-weight value, and personal data, They are a preparation and aerobic sports equipment displaying a body fat percentage which said body fat percentage calculating means computed on said indicator. An invention of claim 3 is the aerobic sports equipment according to claim 1 or 2 attaching said control box exchangeable.

[0007]

[Embodiment of the Invention]With reference to drawings, an embodiment of the invention is described below.

[0008]The lineblock diagram of a bicycle ergometer is shown in drawing 1 as aerobic sports

equipment which carried out this invention. A bicycle ergometer is provided with the handle H, the saddle S, and the pedal P, and attaches the control box 1 exchangeable between the handles H. The measurement-of-body-weight sensor (not shown) which comprises a strain gage is attached to the base of body part B.

[0009]The front view of the control box 1 is shown in drawing 2. The control box 1 contains the human-body-impedance measuring circuit 2 mentioned later, It equips with the electric supply lateral electrode H1 which attaches the grip G to the right and left of a case, and constitutes four terminal electrodes, H1 and the detection lateral electrode H2, and H2, the indicator D of color LCD is formed in a transverse plane, and the rise key K1, the down key K2, the selection key K3, and a start and a termination key K4 are arranged in the lower part, respectively.

[0010]The electric supply lateral electrode H1, H1 and the detection lateral electrode H2, and H2 cover the surface with hard chrome plating etc., and they establish and arrange an interval so that it may not contact mutually.

[0011]The indicator D displays the pedal speed under movement, mileage, a heart rate, etc., and it displays input data, such as personal data, the measurement result of body fat, etc.

[0012]Whenever the rise key K1 presses a key, it raises one number at a time, and whenever the down key K2 presses a key, it drops one number at a time, and inputs the data of sex, age, height, etc. When inputting data, each default value is displayed, and data input corrects those values and is performed.

[0013]The selection key K3 selects menus, such as setting out of exercise load, measurement of a heart rate, and measurement of body fat.

[0014]Setting out of exercise load is performed by changing the frictional resistance of the pedal P.

[0015]Measurement of a heart rate detects the pulse form potential difference between the both hands generated with pulsation of blood using the electric supply lateral electrode H1, H1 and the detection lateral electrode H2, and at least one electrode of H2, detects the pulsation of the heart by this, and measures a heart rate. And a start and the termination key K4 are pressed, 3 stage deed and maximum oxygen uptake are measured for the test for [1 stage] 3 minutes, and the strength of the heart is displayed in five steps.

[0016]Measurement of body fat operates the rise key K1 and the down key K2, inputs sex, age, and height, presses a start and the termination key K4, and measures human body impedance. A measurement result is divided into a body fat percentage or fat weight, and a lean body mass, and is displayed on the indicator D in forms, such as a numerical value or a graph.

[0017]The block diagram of the human-body-impedance measuring circuit 2 is shown in drawing 3. The human-body-impedance measuring circuit 2 supplies the sinusoidal wave alternative current voltage which is 50 kHz which the oscillator 21 generates via the drive

circuit 22, the transformer T1, and the change-over switch 23A to the electric supply lateral electrode H1 of the control box 1, and H1.

[0018]Sex, age, and height are inputted and measurement of human body impedance is performed by grasping the grip G of the control box 1 with both hands, after sitting on the saddle S and measuring weight. If a start and the termination key K4 are pressed in this attitude, a volts alternating current will occur between the detection lateral electrode H2 on either side and H2. These volts alternating currents are changed into direct current voltage via the change-over switch 23A, the transformer T2, the band-pass filter 24, the rectification circuit 25, and the amplifier 26, and waveform shaping, level adjustment, and after carrying out offset control, it inputs into CPU4 via A/D converter 27 and I/O interface 6. This measures the human body impedance between both hands.

[0019]In order to correct the error of measurement by aging and temperature characteristics of an element which constitute the human-body-impedance measuring circuit 2, before measuring human body impedance, the output characteristics of a detecting side circuit are proofread beforehand. That is, the relation of the volts alternating current V which human-body-impedance Z which is two variates, and a detecting side circuit detect is applied to regression line Z=k-V+C0. And the same predetermined volts alternating current as the time of resistance measuring human-body-impedance Z to the dummy resistor R1 which is known two, and the both ends of R2 is impressed, the dummy resistor R1 and the volts alternating current V generated to the both ends of R2 are detected, and it asks for the proportionality constant k and the fixed constant C0 of a regression line.

[0020]For this reason, a control signal is outputted from CPU4, the change-over switch 23A is switched via I/O interface 6, the change unit 28, and the switching control circuit 29A, and the two dummy resistors R1 and R2 are connected between the downstream of the transformer T1, and the primary side of the transformer T2. Next, a control signal is outputted from CPU4, the change-over switch 23B is switched via I/O interface 6, the change unit 28, and the switching control circuit 29B, and a measuring object is switched to the dummy resistor R1 or the dummy resistor R2.

[0021]

[Effect of the Invention]As explained above, the aerobic sports equipment of this invention grasps the grip electrode which measures the heart rate with which the control box was equipped, measures human body impedance, computes a body fat percentage by this, and displays it on an indicator. Therefore, since change of muscular volume is grasped from change of a body fat percentage and the effect of movement is known, goal setting of proper quantity of motion is carried out, and it comes to be able to perform more effective training according to this invention. It is not necessary to provide an electrode for exclusive use independently, and body fat can be measured with the same feeling as measurement of a

heart rate. Since there are few opportunities to touch an electrode compared with the case where an electrode is attached to the handle of aerobic sports equipment, there is no fear of becoming dirty from sweat etc. or rusting.

[0022]The aerobic sports equipment of this invention attaches a control box exchangeable. Therefore, according to this invention, the function which measures body fat easily also to existing aerobic sports equipment can be added.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]The treadmill with which this invention performs walking movement and jogging movement, The bicycle ergometer which performs cycling movement, the steer climber who performs stairs going-up movement, The rowing machine which performs boat stroke movement, the Nordic-events machine which performs cross-country-skiing movement, etc. are related with the aerobic sports equipment which is effective in supplying oxygen and burning body fat by exercise of the whole body.

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, the aerobic sports equipment of this invention grasps the grip electrode which measures the heart rate with which the control box was equipped, measures human body impedance, computes a body fat percentage by this, and displays it on an indicator. Therefore, in this invention, change of muscular volume is grasped from change of a body fat percentage, and the effect of movement is known.
Therefore, goal setting of proper quantity of motion is carried out, and it comes to be able to perform more effective training.
It is not necessary to provide an electrode for exclusive use independently, and body fat can be measured with the same feeling as measurement of a heart rate. Since there are few opportunities to touch an electrode compared with the case where an electrode is attached to the handle of aerobic sports equipment, there is no fear of becoming dirty from sweat etc. or rusting.
[0022]The aerobic sports equipment of this invention attaches a control box exchangeable. Therefore, according to this invention, the function which measures body fat easily also to existing aerobic sports equipment can be added.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]The purpose of exercising using aerobic sports equipment is an aim also with big strengthening a cardiopulmonary function, consuming body fat excessive besides heightening whole body endurance etc., canceling and also using obesity as the tightened body. For example, cycling movement using a bicycle ergometer is aerobic movement which has most generally gone in the fitness institution. There being few body motions and the upper body's being stable as the feature, the membrum inferius, a thing [the burden to the lumbar part], etc. are raised. The latest aerobic sports equipment has many which can monitor a heart rate quite correctly by year sensor, a grip electrode, etc., and the kind of exercise program built in the microcomputer is also abundant, There is also an exercise program which can adjust a fixed heart rate automatically from what is controlled by a manual, for example so that it may become less than **five heartbeats.

[0003]By physiological adaptation, muscles get fat by giving load, and activate a nervous system, and its muscle function improves. It is necessary to give the resistance beyond the muscular power which the minimum also uses in everyday life from the principle of an overload (overload) to muscles as load strength of resistance training. Since it shrinks if it does not use, and a function also falls in connection with it, in order to maintain the effect acquired by training, it is important for muscles to perform continuous training also after that. It is [however] large, and by the time the effect brought about by the morphological change of muscles, such as myopachynsis, by adaptation of a nervous system shows up, the pile of prolonged training is required for the effect acquired by short resistance training. Thus, more effective training can be performed, if weight and body fat are measured, change of muscular volume is grasped and the target of proper quantity of motion is set up, when performing aerobic movement for the purpose of the diet of strengthening of strength of its legs, ******, etc.

[0004]Then, this invention is made for the purpose of grasping change of muscular volume and

being able to be made to perform goal setting of proper quantity of motion by measuring body fat using the grip electrode of the heart rate meter with which the latest aerobic sports equipment is equipped.

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MEANS

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[0007]
[Embodiment of the Invention]With reference to drawings, an embodiment of the invention is described below.
[0008]The lineblock diagram of a bicycle ergometer is shown in drawing 1 as aerobic sports equipment which carried out this invention. A bicycle ergometer is provided with the handle H,

the saddle S, and the pedal P, and attaches the control box 1 exchangeable between the handles H. The measurement-of-body-weight sensor (not shown) which comprises a strain gage is attached to the base of body part B.

[0009]The front view of the control box 1 is shown in drawing 2. The control box 1 contains the human-body-impedance measuring circuit 2 mentioned later, It equips with the electric supply lateral electrode H1 which attaches the grip G to the right and left of a case, and constitutes four terminal electrodes, H1 and the detection lateral electrode H2, and H2, the indicator D of color LCD is formed in a transverse plane, and the rise key K1, the down key K2, the selection key K3, and a start and a termination key K4 are arranged in the lower part, respectively.

[0010]The electric supply lateral electrode H1, H1 and the detection lateral electrode H2, and H2 cover the surface with hard chrome plating etc., and they establish and arrange an interval so that it may not contact mutually.

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[0012]Whenever the rise key K1 presses a key, it raises one number at a time, and whenever the down key K2 presses a key, it drops one number at a time, and inputs the data of sex, age, height, etc. When inputting data, each default value is displayed, and data input corrects those values and is performed.

[0013]The selection key K3 selects menus, such as setting out of exercise load, measurement of a heart rate, and measurement of body fat.

[0014]Setting out of exercise load is performed by changing the frictional resistance of the pedal P.

[0015]Measurement of a heart rate detects the pulse form potential difference between the both hands generated with pulsation of blood using the electric supply lateral electrode H1, H1 and the detection lateral electrode H2, and at least one electrode of H2, detects the pulsation of the heart by this, and measures a heart rate. And a start and the termination key K4 are pressed, 3 stage deed and maximum oxygen uptake are measured for the test for [1 stage] 3 minutes, and the strength of the heart is displayed in five steps.

[0016]Measurement of body fat operates the rise key K1 and the down key K2, inputs sex, age, and height, presses a start and the termination key K4, and measures human body impedance. A measurement result is divided into a body fat percentage or fat weight, and a lean body mass, and is displayed on the indicator D in forms, such as a numerical value or a graph.

[0017]The block diagram of the human-body-impedance measuring circuit 2 is shown in drawing 3. The human-body-impedance measuring circuit 2 supplies the sinusoidal wave alternative current voltage which is 50 kHz which the oscillator 21 generates via the drive circuit 22, the transformer T1, and the change-over switch 23A to the electric supply lateral

electrode H1 of the control box 1, and H1.

[0018]Sex, age, and height are inputted and measurement of human body impedance is performed by grasping the grip G of the control box 1 with both hands, after sitting on the saddle S and measuring weight. If a start and the termination key K4 are pressed in this attitude, a volts alternating current will occur between the detection lateral electrode H2 on either side and H2. These volts alternating currents are changed into direct current voltage via the change-over switch 23A, the transformer T2, the band-pass filter 24, the rectification circuit 25, and the amplifier 26, and waveform shaping, level adjustment, and after carrying out offset control, it inputs into CPU4 via A/D converter 27 and I/O interface 6. This measures the human body impedance between both hands.

[0019]In order to correct the error of measurement by aging and temperature characteristics of an element which constitute the human-body-impedance measuring circuit 2, before measuring human body impedance, the output characteristics of a detecting side circuit are proofread beforehand. That is, the relation of the volts alternating current V which human-body-impedance Z which is two variates, and a detecting side circuit detect is applied to regression line Z=k-V+C0. And the same predetermined volts alternating current as the time of resistance measuring human-body-impedance Z to the dummy resistor R1 which is known two, and the both ends of R2 is impressed, the dummy resistor R1 and the volts alternating current V generated to the both ends of R2 are detected, and it asks for the proportionality constant k and the fixed constant C0 of a regression line.

[0020]For this reason, a control signal is outputted from CPU4, the change-over switch 23A is switched via I/O interface 6, the change unit 28, and the switching control circuit 29A, and the two dummy resistors R1 and R2 are connected between the downstream of the transformer T1, and the primary side of the transformer T2. Next, a control signal is outputted from CPU4, the change-over switch 23B is switched via I/O interface 6, the change unit 28, and the switching control circuit 29B, and a measuring object is switched to the dummy resistor R1 or the dummy resistor R2.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a lineblock diagram of the bicycle ergometer which carried out this invention.
[Drawing 2]It is a front view of the control box which carried out this invention.
[Drawing 3]It is a block diagram of the human-body-impedance measuring circuit which carried out this invention.
[Description of Notations]
1 Control box
2 Human-body-impedance measuring circuit
21 Oscillator
22 Drive circuit
23 Change-over switch
24 Band-pass filter
25 Rectification circuit
26 Amplifier
27 A/D converter
28 Change unit 28
29 Switching control circuit
4 CPU
6 I/O interface
B Body part
H Handle
H1 Electric supply lateral electrode
H2 Detection lateral electrode
K Key
P Pedal

S Saddle
T1-T2 Transformer

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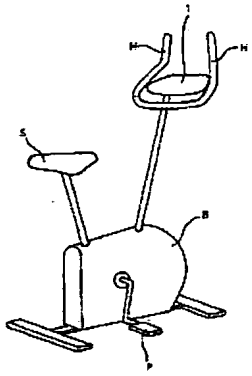
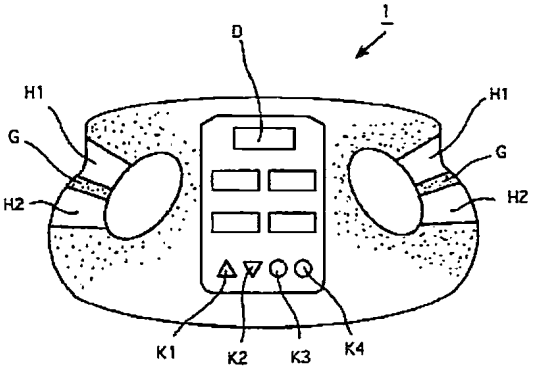
DRAWINGS

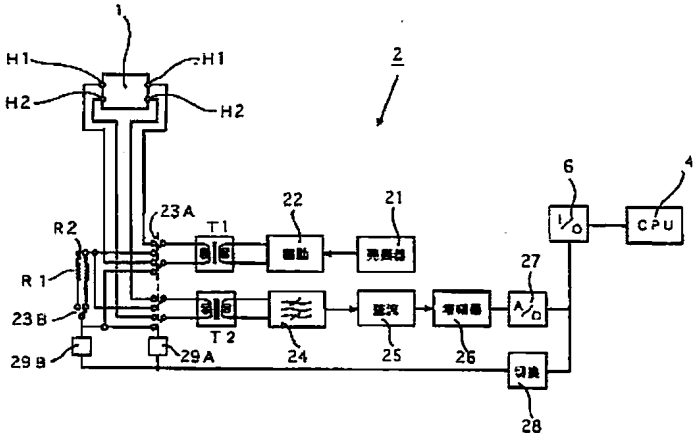
[Drawing 1]



[Drawing 2]



[Drawing 3]


1
H1
H1
H2
H2
2
6
4
I/O
CPU
22
21
23A
T1
R2
R1
23B
T2
29B
29A
24
25
26
27
A/D
28